

## RESEARCH PAPERS

"The Equilibrium Analysis of Alternative Housing Allowance Payments," (with Joseph Ferreira) Chapter 6 of Analysis of a Direct Housing Allowance Program, The Joint Center for Urban Studies of M.I.T. and Harvard University, (July 1975).

"Theories of Vertical Integration," presented at Fourth Annual Telecommunications Conference. Appears in a volume of Proceedings of the Fourth Annual Telecommunications Conference, Office of Telecommunications Policy, (April 1976).

"Uncertainty, Production Lags, and Pricing," American Economic Review, (February 1977).

"Selecting Subsidy Strategies for Housing Allowance Programs," (with Joseph Ferreira) Journal of Urban Economics, (July 1977).

"Peak Load Pricing With Stochastic Demand," American Economic Review, (December 1977).

"The Distribution of Permanent Income," (with Robert Hall) presented at the Symposium on Income Distribution and Economic Inequality, (May 1976). Published in Income Distribution and Economic Inequality, edited by Zvi Griliches, et al. (Halsted Press, 1978).

"Market Behavior with Demand Uncertainty and Price Inflexibility," American Economic Review, (September 1978).

"Why New Firms Locate Where They Do: An Econometric Model," in Studies in Regional Economics, edited by W. Wheaton, (Urban Institute, 1980). Presented at the Conference on Regional Economics, sponsored by the Committee on Urban and Public Affairs, Baltimore, Maryland (May 1978).

"Vertical Integration--An Overview," in Congressional Record Hearings on the Communications Act of 1978. Bill H.R. 13105, (August 3, 1978).

"Vertical Integration in Competitive Markets Under Uncertainty," Journal of Industrial Economics, (March 1979). Awarded the P.W.S. Memorial Prize for the best essay in the field of Industrial Organization by a scholar under the age of thirty.

"Valuing Benefits and Costs in Related Output and Input Markets," American Economic Review, (September 1979).

"Contracts, Price Rigidity and Market Equilibrium," Journal of Political Economy, (October 1979).

"Benefits and Costs of Airline Mergers: A Case Study," (with W. Landes and R. Posner) Bell Journal of Economics, (Spring 1980).

"The Limitations of Pigouvian Taxes as a Long Run Remedy for Externalities," (with G. Loury) Quarterly Journal of Economics, (September 1980).

"The Law and Economics of Rights in Valuable Information: A Comment," Journal of Legal Studies, (December 1980).

"Price Discrimination: Vertical Integration and Divestiture in Natural Resources Markets," (with J. Perloff) Resources and Energy, (March 1981).

"The Spatial Effects of a Tax on Housing and Land," Regional Science and Urban Economics, (November 1981).

"Comments on Weicher," Journal of Law and Economics, (December 1981).

Comment, in Sherwin Rosen ed. Studies in Labor Markets, University of Chicago Press, (1981).

"Planning and Market Structure," in The Economics of Information and Uncertainty, edited by J.J. McCall, University of Chicago Press, (1982).

"The Disruptive Effect of Inflation on the Organization of Markets," in Robert Hall, ed. The Economics of Inflation, University of Chicago Press, (1982).

"A Reexamination of Delivered Pricing," Journal of Law and Economics, (April 1983).

"Futures Trading, Market Interrelationships, and Industry Structure," American Journal of Agricultural Economics, (May 1983).

"The Location and Employment Choices of New Firms: An Econometric Model with Discrete and Continuous Endogenous Variables," The Review of Economics and Statistics, (August 1983).

"The Need for Coordination Among Firms With Special Reference to Network Industries," (with J. M. Klammer) University of Chicago Law Review, (Spring 1983).

"The Regulation of Insider Trading" (with D. Fischel), Stanford Law Review, (May 1983).

"Economic Goals and Remedies of the AT&T Modified Final Judgement" (with W. Lavey), Georgetown Law Review, (August 1983).

"Equilibrium Fluctuations When Price and Delivery Lags Clear the Market," Bell Journal of Economics, (Autumn 1983).

"Futures Markets: Their Purpose, Their History, Their Growth, Their Successes and Failures," paper presented at the Columbia University Conference on Futures Markets, February 1984, Journal of Futures Markets, (September 1984). (Reprinted in Futures Markets edited by A.G. Malliaris and W.F. Mullady, Edward Elgar Publishing Limited, 1995.)

"Energy and Location," presented at the Brookings Conference on Housing and Energy, Washington, D.C., (November 1981), Energy Costs, Urban Development, and Housing, Brookings Institution, (1984).

"The Limitations of Pigouvian Taxes As A Long Run Remedy for Externalities: Extension of Results," (with G. Loury) Quarterly Journal of Economics, (August 1986).

"The Rigidity of Prices," American Economic Review, (September 1986).

"The Theory and The Facts of How Markets Clear: Is Industrial Organization Valuable for Understanding Macroeconomics?" in Handbook of Industrial Organization, eds. Schmalensee and Willig, (1989).

"Market Power and Mergers in Durable Good Industries," (with R. Gertner), Journal of Law and Economics, (October 1989).

Comments on Vertical Foreclosure, Brookings Papers on Economic Activity, (December 19, 1989).

Book Review of Tirole's The Theory of Industrial Organization, Journal of Political Economy, (June 1990).

"The Genesis of Inflation and the Costs of Disinflation: Comment," Journal of Money, Credit & Banking, (August 1991, Part 2).

"The Theory of Allocation and its Implications for Marketing and Industrial Structure: Why Rationing is Efficient," Journal of Law and Economics, (October 1991).

"The Economics of Cooperation and Competition in Electronic Services Network Industries," in Economics of Electronic Service Networks, Wildman Steven ed., Praeger Press, (1992).

"Merger Policy and Market Definition Under the EC Merger Regulation," Conference on Antitrust in a Global Economy, Fordham Corporate Law Institute, (1994).

"The Antitrust Economics of Credit Card Networks," (with A. Frankel) Antitrust Law Journal, (Winter 1995).

"Economic Organization and Conflict", Journal of Institutional and Theoretical Economics, (March 1995).

"Antitrust and Higher Education: Was There a Conspiracy to Restrict Financial Aid?" (with G. Bamberger and R. Epstein) The Rand Journal of Economics, (Vol. 26, No. 1, Spring 1995, pp. 131-147).

"The Competitive Effects of Line-of-business Restrictions in Telecommunications," (with K. Arrow and H. Sider), Managerial and Decision Economics, (Vol. 16, pp. 301-321, 1995). (Reprinted in Deregulating Telecommunications - The Baby Bells Case for Competition, edited by Richard S. Higgins and Paul H. Rubin, John Wiley & Sons Ltd., 1995.)

"The Antitrust Economics of Credit Card Networks: Reply to Evans and Schmalensee," (with A. Frankel), Antitrust Law Journal, (Spring 1995).

"Antitrust and Payment Technologies," (with A. Frankel), Review, Federal Reserve Bank of St. Louis (November/December 1995).

"Antitrust Policy Toward Mergers When Firms Innovate: Should Antitrust Recognize the Doctrine of Innovation Markets?" Testimony before the Federal Trade Commission Hearings on Global and Innovation-based Competition (October, 1995).

"You Keep on Knocking But You Can't Come In: Evaluating Restrictions on Access to Input Joint Ventures," (with S. Salop), Harvard Journal of Law & Technology, (Volume 9, Summer, 1996).

"Comments on Causes and Consequences of Airline Fare Wars," Micro Brookings Papers on Economic Activity, (1996).

"A Critical Assessment of the Role of Imperfect Competition in Macroeconomics," in Market Behaviour and Macro Economic Modeling, Brakman, Van Ees, & Kuipers (eds.), MacMillan Press (1997).

"Price Rigidity," Business Cycles and Depressions, David Glasner ed., Garland Publishing, Inc., (1997).

"Communication Among Competitors: Game Theory and Antitrust," (with R. Gertner and A. Rosenfield), George Mason Law Review, (1997).

"Antitrust and Higher Education: MIT Financial Aid (1993)" (September 1997) (with G. Bamberger), The Antitrust Revolution, (Oxford University Press), 3rd edition (October, 1998) (forthcoming).

"An Analysis of the Toys 'R' Us Case," (with H. Sider), The Academic Economist and Economic Analysis in Litigation Support, edited by Daniel Slottje, (forthcoming).

#### UNPUBLISHED PAPERS

"Modeling the Housing Allowance Program," M.A. Thesis, Massachusetts Institute of Technology (September 1974).

"The Cost of Eliminating a Futures Market and The Effect of Inflation on Market Interrelationships," (1984).

"The Empirical Importance of Delivery Lags as an Explanation of Demand," (1984).

"Airline Networks and Fares," (with G. Bamberger), (1996).

"The Choice of Organizational Form in Gasoline Retailing and The Costs of Laws Limiting that Choice," (with A. Blass), (1996).

"Statistical Supplement to The Antitrust Economics of Credit Card Networks: Reply to Evans and Schmalensee Comment, 63 Antitrust Law Journal 903 (1995)," (with Alan Frankel), (May 1997).

### EXPERT TESTIMONIAL EXPERIENCE

Testimony of Dennis W. Carlton in Re: "Vertical Integration--An Overview." Congressional Record Hearings on the Communications Act of 1978: Proceedings before the House on Bill H.R. 13105, August 3, 1978.

Testimony of Dennis W. Carlton, William M. Landes and Richard A. Posner in Re: Competitive Effects of the Proposed North Central-Southern Airline Merger: Proceedings before the Civil Aeronautics Board, Docket No. 33136, Exhibit NC/SO-T-7, October 13, 1978 and October 9, 1979.

Testimony of Dennis W. Carlton in Re: McNeilab, Inc.: Proceedings before the United States Department of Justice, Drug Enforcement Administration, Docket No. 78-13, March 13, 1980 and May 1980 (Oral).

Testimony of Dennis W. Carlton in Re: Acco Industries, Inc. v. Kresl Power Equipment, Inc.: In the U.S. Court of Appeals For the Seventh Circuit, Docket No. 80-2024, March 29, 1980.

Deposition, Testimony, and Rebuttal Testimony of Dennis W. Carlton in Re: Ethyl Corporation: Proceedings before the Federal Trade Commission, Docket No. 9128, November 10 & 11, 1980 (Deposition), November 13 & 14, 1980 (Testimony), and February 20, 1981 (Rebuttal).

Deposition of Dennis W. Carlton in Re: Independence Tube Corporation v. Copperweld Corporation, Regal Tube Company, The Yoder Company v. David F. Grohne (counter-defendant): In the U.S. District Court for the Northern District of Illinois, Eastern Division, No. 76 C 4201, January 24, 1981.

Affidavit of Dennis W. Carlton in Re: Ellis Banking Corporation, Ellis First National Bank of Bradenton, and Ellis First Security Bank v. Barnett Banks of Florida, Inc., Barnett Bank of Manatee County, and Westside National Bank of Manatee County: In the U.S. District Court for the Middle District of Florida, Tampa Division, No. 81-693-Civ-T-H, July 28, 1981.

Deposition and Economic Report of Dennis W. Carlton in Re: Schneider Industrial Sales and Service Company, William Schneider and Mary Emily Schneider v. Acco Industries, Inc.: In the U.S. District Court for the District of New Jersey, April 19, 1982.

Deposition and Testimony of Dennis W. Carlton in Re: City of Batavia, et al. v. Commonwealth Edison Company: Proceedings before the U.S. District Court, Northern District of Illinois, Eastern Division, No. 76 C 4388, May 17, 18 & 25, 1982 (Deposition), and July 22, 1982 (Testimony).

Deposition of Dennis W. Carlton in Re: M. K. Metals Inc., et al. v. National Steel Corporation: In the U.S. District Court for the Northern District of Illinois, Eastern Division, No. 79 C 1661, September 15, 1983.

Declaration and Deposition of Dennis W. Carlton in Re: Carter Hawley Hale Stores, Inc. v. The Limited, Inc., et al.: In the U.S. District Court, Central District California, No. CV 84 22000 AWT (JRX), April 21, 1984 (Declaration), and April 23, 1984 (Deposition).

Verified Statements and Testimony of Dennis W. Carlton in Re: Denver & Rio Grande Western Railroad v. Santa Fe Southern Pacific Corporation et al.: Proceedings before the Interstate Commerce Commission, Docket No. 30400, August 28, 1984, November 14, 1984, and May 22, 1985, (Statements), and January 30, 1985, and June 19, 1985, (Testimony).

Affidavit of Dennis W. Carlton and William M. Landes in Re: United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company: In the United States District Court for the District of Columbia, December 19, 1984.

Statement of Carlton, DeMuth, Landes, and Rosenfield in Response to the National Telecommunications Information Administration (NTIA) Request for Comments in Connection with the Comprehensive Study of the Structure and Regulation of the U.S. Telecommunications Industry, March 29, 1985.

Deposition and Affidavit of Dennis W. Carlton in Re: L&W Industries, Inc. v. American Standard, Inc.: In the U.S. District Court, Eastern District of Wisconsin, Civil Action No. 81-C-1409, May 14, 1985 (Deposition) and August 30, 1985 (Affidavit).

Testimony of Dennis W. Carlton in Re: E. I. Du Pont De Nemours and Company's Thebaine Import Application: Proceedings before the U.S. Department of Justice, Drug Enforcement Administration, Docket No. 84-51, May 31, 1985.

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Deposition of Dennis W. Carlton in Re: General Motors "THM 200" Transmission Litigation: Proceedings before the U.S. District Court, Northern District of Illinois, Eastern Division, No. 79 C 1249, 80 C 2151 and 85 C 4805, July 2, 1986.

Affidavit of Dennis W. Carlton in Re: Norwest Bank Fire Case: Proceedings before the U.S. District Court, Fourth Judicial District, State of Minnesota, Court File No. 83-08122, August 28, 1986.

Affidavit of Dennis W. Carlton in Re: Policy and Rules Concerning Rates for Dominant Carriers: Before the Federal Communications Commission, Washington, D.C., Docket No. 87-313, October 16, 1987.

Deposition of Dennis W. Carlton in Re: Research Institute for Medicine and Chemistry, Inc. v. Wisconsin Alumni Research Foundation: In the U.S. District Court, Western District of Wisconsin, Case No. 85-C-1060-D, October 20 & 21, 1986.

Affidavit and Deposition of Dennis W. Carlton in Re: United States Football League, et al. v. National Football League, et al.: In the U.S. District Court, Southern District of New York, 84 Civ. 7484 (PKL), November 24, 1986 (Affidavit), February 26, 1986 and December 4, 1986 (Deposition).

Verified Statements of Dennis W. Carlton in Re: Coal Trading Corporation, et al. v. The Baltimore and Ohio Railroad Co., et al.: Before the Interstate Commerce Commission, ICC Docket No. 38301S, December 16, 1986 and September 8, 1987.

Testimony of Dennis W. Carlton in Re: The Application of Pacific Bell, a Corporation, for Authority to Increase Certain Intrastate Rates and Charges Applicable to Telephone Services Furnished within the State of California, California Public Utilities Commission, Application No. 85-01-034, December 19, 1986, and January 22 & 28, 1987.

Deposition of Dennis W. Carlton in Re: John H. Torphy v. Touche Ross & Co., et al.: In the Circuit Court Dane County, State of Wisconsin, Case No. 82-CV-4033, August 25, 1987.

Deposition of Dennis W. Carlton in Re: Martin Exploration Management Company, et al. v. Panhandle Eastern Corporation, et al.: In the U.S. District Court for the District of Colorado, Civil Action No. 86-Z-804, May 5, 6 & 18, 1988.

Deposition of Dennis W. Carlton in Re: The Dow Chemical Company v. Halliburton Company and The Dow Chemical Company v. Mississippi Power & Light Company: In the U.S. District Court for the Northern District of Mississippi Greenville Division, No. GC-78-31-GD-D and No. GC-78-32-GD-D, June 16, 1988.

Statements and Testimony of Dennis W. Carlton in Re: Trailer Train Company et al., Approval of Pooling of Car Service With Respect to Flat Cars: Before the Interstate Commerce Commission, Finance Docket No. 27590. (Sub-No. 1), July 7 & 14, 1988 (Statements) and July 25 & 26, 1988 (Testimony).

Testimony of Dennis W. Carlton in Re: Pontarelli Limousine, Inc. v. City of Chicago, Finance Docket No. 83-C-6716, September 25 & 26, 1989.

Deposition of Dennis W. Carlton in Re: Great Northern Nekoosa Corporation v. Georgia-Pacific Corporation: Before the United States District Court District of Connecticut, Civ. Action No. B-89-607-WWE, December 28, 1989 and January 15, 1990.

Testimony of Dennis W. Carlton in Re: The Matter of the Physicians and Surgeons Medical Malpractice Insurance Rates of St. Paul Fire & Marine Insurance Company: Before the State of Minnesota Office of Administrative Hearings for the Commissioner of Commerce, O.A.H. Docket No. 0-1004-3412-2, January 1990.

Deposition of Dennis W. Carlton in Re: Dale A. Ervin, et al. v. Amoco Oil Company, et al.: In the District Court, City and County of Denver, State of Colorado, No. 88-CV-11994, September 5, 1990.

Reply Affidavit of Dennis W. Carlton and George J. Stigler in Re: United States of American v. Western Electric Company Inc. and American Telephone and Telegraph Company: In the United States District Court for the District of Columbia, Civil Action No. 82-0192, January 10, 1991.

Testimony of Dennis W. Carlton in Re: Westreco, Inc. v. Commissioner of Internal Revenue: In the United States Tax Court, Washington, D.C. 20217, Docket No. 24078-88, January 29, 1991.

Deposition, Testimony, and Rebuttal Testimony of Dennis W. Carlton in Re: In the Matter of Marathon Oil Company and Phillips Petroleum Company: Before the Department of Revenue, State of Alaska, Case No. 89314, April 23 & 24, 1991 (Deposition), March 28, 1991, June 19, 1991 (Testimony), July 22, 1991 (Rebuttal Testimony) and October 3 & 4, 1991 (Oral).

Deposition of Dennis W. Carlton in Re: Martin Exploration Management Company, et al. v. Panhandle Eastern Pipeline Corporation, et al.: In the U.S. District Court for the District of Colorado, Civil Action No. 91-N-110, February 5, 1992.

Deposition, Affidavit and Testimony of Dennis W. Carlton in Re: United States of America v. Brown University, et al.: In the U.S. District Court For the Eastern District of Pennsylvania, Civil Action No. 91-CV-3274, February 18 & 19, 1992 (Deposition), April 28, 1992 (Affidavit), and July 8 & 9, 1992 (Testimony).

Deposition of Dennis W. Carlton in Re: United States of America, People of The State of California, et al. v. J. B. Stringfellow, Jr., et al.: In the United States District Court Central District of California, No. CIV 83-2501 JMI, March 10 & 11, 1992.

Affidavit of Dennis W. Carlton in Re: SCFC ILC, Inc. d/b/a MountainWest Financial v. Visa U.S.A., Inc.: In the U.S. District Court for the District of Utah, Central Division, Civil No. 2:91-cv-047B, June 25, 1992.

Deposition and Testimony of Dennis W. Carlton in Re: Adcom, Incorporated, Cutrone Communications, Incorporated, Great Southern Communications Incorporated, Nola Communications Incorporated and Conrad Communications, Incorporated v. Nokia Corporation, Nokia-Mobira Oy, Nokia-Mobira, Incorporated, Nokia, Incorporated, Nokia Data Communications and Cue Paging Corporation: In the United States District Court for the Eastern District of Louisiana, Civil Action Number 90-4088, November 3 & 4, 1992 (Deposition), and February 9 & 10, 1993 (Testimony).

Statement, Supplemental Statement and Deposition of Dennis W. Carlton in Re: City of Dillingham, et al. v. Western Pioneer, Inc., et al., and City of Nome v. Western Pioneer, Inc., et al.: In the United States District Court for the District of Alaska, No. A89-014 Civil (Consolidated for Pre-Trial Proceedings with No. N89-004 Civil), November 6, 1992 (Statement and Supplemental Statement) and November 24, 1992 (Deposition).

Verified Statement of Dennis W. Carlton in Re: Kansas City Southern Industries, Inc., The Kansas City Southern Railway Company and K&M Newco, Inc. -- Control -- MidSouth Corporation, MidSouth Rail Corporation, MidLouisiana Rail Corporation, SouthRail Corporation and TennRail Corporation, Before the Interstate Commerce Commission, Finance Docket No. 32167, May 1993.

Verified Statements and Deposition of Dennis W. Carlton in Re: Union Pacific Corporation, Union Pacific Railroad Company and Missouri Pacific Railroad Company -- Control -- Chicago and North Western Holdings Corp. and Chicago and Northwestern Transportation Company: Before the Interstate Commerce Commission, Finance Docket No. 32133, May 24, 1993, June 21, 1993, and November 24, 1993 (Statements), and March 17, 1994, and July 26, 1994 (Deposition).

Verified Statement of Dennis W. Carlton in Re: Application of TTX Company and Certain Common Carriers by Railroad For Approval of Amendment of Pooling Agreement and Car Contract Extending Their Terms, Before the Interstate Commerce Commission, Finance Docket No. 27590 (Sub-No. 2), November 19, 1993.

Deposition of Dennis W. Carlton in Re: Merck & Co., Inc. v. Alcon Laboratories, Inc., In the United States District Court for the District of Delaware, No. C.A. 92-691, December 14, 1993.

Deposition and Affidavit of Dennis W. Carlton in Re: Northwest Airlines, Inc. v. American Airlines, Inc., Before the United States District Court, District of Minnesota, Fourth Division, C.V. No. 4-91-539, February 22 & 23, 1994, May 16 & 17, 1995, and July 8, 1997 (Deposition); and February 20, 1995 and May 9, 1996 (Affidavit).

Testimony of Dennis W. Carlton in Re: Florida Power & Light Company: Before the Federal Energy Regulatory Commission, Docket Nos. ER93-465-000, ER93-507-000, ER-93-922-000, and EL94-12-000, April 8, 1994, October 19, 1994, and June 22, 1995.

Testimony of Dennis W. Carlton in Re: The Matter of Touchfax Information Systems Inc. and Landis & Gyr Communications: Before the American Arbitration Association, No. 13-T-133-00260-93, May 10, 1994.

Affidavit and Declaration of Kenneth J. Arrow and Dennis W. Carlton in Re: United States of America v. Western Electric Company, Inc., and American Telephone and Telegraph Company: Before the United States District Court for the District of Columbia, Civil Action No. 82-0192, February 28, 1994 (Affidavit), and May 30, 1995 (Declaration).

Affidavit and Testimony of Dennis W. Carlton and Alan S. Frankel in Re: Leonard R. Kahn v. Emerson Electric Co., a Missouri corporation; Hazeltine Corporation, a Delaware corporation; and Motorola, Inc., a Delaware corporation; John Doe corporations 1-x; and John Does 1-x, individually; Before the United States District Court, for the Eastern District of New York, 92 Civ. 3063 (ADS), October 20, 1994 (Affidavit), and May 22, 1995 (Testimony).

Deposition and Testimony of Dennis W. Carlton in Re: Federal Trade Commission v. B.A.T. Industries P.L.C., Brown and Williamson Tobacco Corporation; American Brands, Inc.; and American Tobacco Company, Before the United States District Court, Southern District of New York, C.V. No. 94 Civ. 7849, November 20, 1994 (Deposition), and December 14, 1994 (Testimony).

Affidavit, Supplemental Affidavit and Deposition of Dennis W. Carlton in Re: Weatherford Roofing Company v. Employers National Insurance Company and Employers Casualty Company et al: In the United States District Court for the District of Dallas County, Texas, 116th Judicial District, No. 91-05637, May 5, 1995 (Affidavit), May 9-10 & June 1, 1995 (Deposition), and October 20, 1995 (Supplemental Affidavit).

Affidavit of Dennis W. Carlton in Re: Airline Travel Agency Commission Antitrust Litigation: In the United States District Court for the District of Minnesota, No. 4-95-107, June 14, 1995.  
Declaration of Dennis W. Carlton in Re: Donnelly Corporation v. Gentex Corporation: In the United States District Court for the Western District of Michigan, Southern Division, Case No. 1:93 CV 530, October 20, 1995.

Testimony of Dennis W. Carlton before the Federal Trade Commission Hearings on Global and Innovation-based Competition, October 25, 1995.

Report and Deposition of Dennis W. Carlton in Re: Brand Name Prescription Drugs Antitrust Litigation, In the United States District Court for the Northern District of Illinois, Eastern Division, MDL No. 997, November 20, 1995 (Report), December 18 & 19, 1995 (Deposition).

Expert Report and Deposition of Dennis W. Carlton in Re: Johnson Matthey v. General Motors (Antitrust Counterclaim), District Court for the Eastern District of Wisconsin, No. 93 C 0931, January 9, 1996 (Expert Report), February 14, 1996 (Deposition).

Brief of Evidence, Summary of Evidence, and Testimony of Dennis W. Carlton on Behalf of Defendants in Re: Shell (Petroleum Mining) Company Limited and Todd Petroleum Mining Company Limited v. Kapuni Gas Contracts Limited and Natural Gas Corporation of New Zealand Limited, In the High Court of New Zealand, Auckland Registry, Commercial List, CL 5/94, April 2, 1996 (Brief of Evidence), July 18, 1996 (Summary of Evidence), and July 18-19, 1996 (Testimony).

Expert Report, Deposition, and Testimony of Dennis W. Carlton in Re: The Matter of the Arbitration Between Sprint Communications Company L.P. and Network 2000 Communications Corporation, Arbitration Case Number 57 181 0013 94, July 15, 1996 (Expert Report with H. Sider), August 12, 1996 (Deposition), and September 27, 1996 (Testimony).

Testimony and Prepared Statement of Dennis W. Carlton on behalf of Sacramento Municipal Utility District in Re: Pacific Gas & Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company: Before the Federal Energy Regulatory Commission Technical Conference on Market Power & Transmission Pricing, Docket Nos. ER96-1663-000, EC96-19-000, EL96-48-000, September 12, 1996.

Declaration of Dennis W. Carlton in Re: United States of America v. International Business Machines: In the United States District Court for the Southern District of New York, Civil Action No. 72-344 (AGS), November 12, 1996.

Expert Report, Affidavit Rebuttal and Deposition of Dennis W. Carlton in Re: Bell Atlantic Corporation and DSC Communications Corporation v. AT&T Corporation and Lucent Technologies Inc., Civil Action No. 5-96CV45, December 4, 1996 (Expert Report with R.E. Olley and D.S. Sibley), January 10, 1997 (Affidavit Rebuttal with R.E. Olley and D.S. Sibley), and January 21, 1997 (Deposition).

Affidavit of Dennis W. Carlton in Re: Pacific Gas & Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company: United States of America Before the Federal Energy Regulatory Commission, FERC Docket No. ER96-1663-000, January 16, 1997 (with G.E. Bamberger).

Affidavit of Dennis W. Carlton in Re: Advanta Corp., Advanta National Bank U.S.A., and Advanta National Bank v. Visa U.S.A., Inc. and Mastercard International, Inc.: In the United States District Court for the Eastern District of Pennsylvania, Civil Action No. 96-CV-7940, January 21, 1997.

Deposition, Testimony, and Surrebuttal Testimony of Dennis W. Carlton in Re: In the Matter of Toys "R" Us, Inc.: In the United States of America Before the Federal Trade Commission, File No. 9278, March 16, 1997 (Deposition), April 16 and 25, 1997 (Testimony), and June 3, 1997 (Surrebuttal Testimony).

Deposition of Dennis W. Carlton in Re: In the Matter of Theresa Aguilar, et al vs. Atlantic Richfield Corporation et al: In the Superior Court of the State of California In and For the County of San Diego, File No. 700810, September 30, 1997 (Deposition).

Report of Dennis W. Carlton in Re: Few Ready Mix Concrete Co., v. Transit Mix Concrete & Materials Co., et al: In the United States District Court for the Eastern District of Texas Lufkin Division, No. 9:96-CV-86, October 31, 1997 (with W. J. Lynk).

Verified Statement, Depositions, Verified Reply Statement, and Verified Rebuttal Statement of Dennis W. Carlton in Re: CF Industries, Inc. v. Koch Pipeline Company, L.P.: In the United States of America Before the Department of Transportation Surface Transportation Board, No. 41685, November 7, 1997 (Verified Statement), December 19, 1997 (Deposition), January 8, 1998 (Verified Reply Statement), February 3, 1998 (Deposition), and February 20, 1998 (Verified Rebuttal Statement).

Expert Witness Report and Deposition of Dennis W. Carlton in Re: Industrial Silicon Antitrust Litigation: In the United States District Court for the Western District of Pennsylvania, No. 95-2104, January 9, 1998 (Expert Witness Report) and February 10-11, 1998 (Deposition).

Declaration of Dennis W. Carlton in Re: Applications of WorldCom, Inc. and MCI Communications Corporation for Transfer of Control of MCI Communications Corporation to WorldCom, Inc.: Before the Federal Communications Commission, CC Docket No. 97-211, January 25, 1998 (with H. Sider)

Expert Report and Deposition of Dennis W. Carlton in Re: Bepco, Inc., et al v. AlliedSignal Inc. and AlliedSignal Truck Brake System Co.: In the United States District Court for the Middle District of North Carolina, Winston-Salem Division, No. 6:96CV00274, February 3, 1998 (Expert Report) and March 3, 1998 (Deposition).

Affidavit of Dennis W. Carlton in Re: Petition of WorldCom, Inc. for Approval to Transfer Control of MCI Communications Corporation to WorldCom, Inc.: Before the New York State Public Service Commission, No. 97-C-1804, February 16, 1998 (with H. Sider).

Affidavit of Dennis W. Carlton in Re: Petition of WorldCom, Inc. for Approval to Transfer Control of MCI Communications Corporation to WorldCom, Inc.: Before the Florida Public Service Commission, No. 971375-TP, February 27, 1998 (with H. Sider).

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### EDUCATION

Ph.D., UNIVERSITY OF WISCONSIN, Madison, Wisconsin: Economics,  
1980.

M.A., UNIVERSITY OF WISCONSIN, Madison, Wisconsin: Economics, 1978.

B.A., UNIVERSITY OF ILLINOIS, Urbana, Illinois: Economics, 1976.

### EMPLOYMENT

LEXECON INC., Chicago, Illinois (October 1985 - present): Vice President and Senior Economist.

U.S. COMMISSION ON CIVIL RIGHTS, Washington, D.C., (August 1984 - October 1985): Co-Director: Project on Minority Income Trends.

OFFICE OF POLICY: U.S. DEPARTMENT OF LABOR, Washington, D.C., (May 1982 - August 1984): Economist.

PRESIDENT'S TASK FORCE ON FOOD ASSISTANCE (on leave from U.S. Department of Labor), Washington, D.C., (September 1983 - February 1984): Research Associate.

OFFICE OF RESEARCH AND EVALUATION; BUREAU OF LABOR STATISTICS, Washington, D.C., (September 1980 - May 1982): Economist.

UNIVERSITY OF WISCONSIN, Madison, Wisconsin (1978 - 79): Teaching Assistant.

UNIVERSITY OF WISCONSIN, Madison, Wisconsin (1976 - 78): Science Writer

### FIELDS OF SPECIALIZATION

Applied Microeconomics  
Econometrics  
Industrial Organization  
Labor Economics

### ARTICLES

"An Analysis of the Toys 'R' Us Case," (with Dennis Carlton), *The Academic Economist and Economic analysis in Litigation Support*, edited by Daniel Slottje, (forthcoming 1988).

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## Appendix 2.1

### Network Provider Presence and Population by LATA

LATA Number	LATA Name	Included Networks with POPs	LATA Population	Percent of US Population	Cumulative Percent of US Population
0730	LOS ANGELES (CA)	10	15,355,634	5.7%	5.7%
0132	NEW YORK METRO (NY)	10	11,536,322	4.3%	10.1%
0358	CHICAGO (IL)	10	8,344,610	3.1%	13.2%
0224	NORTH JERSEY (NJ)	10	5,822,732	2.2%	15.4%
0340	DETROIT (MI)	10	5,289,160	2.0%	17.3%
0438	ATLANTA (GA)	10	5,088,128	1.9%	19.2%
0236	WASHINGTON (DC)	10	4,128,880	1.5%	20.8%
0234	PITTSBURGH (PA)	10	2,767,034	1.0%	21.8%
0336	INDIANAPOLIS (IN)	10	2,314,844	0.9%	22.7%
0320	CLEVELAND (OH)	10	2,058,371	0.8%	23.5%
0722	SAN FRANCISCO (CA)	9	6,959,937	2.6%	26.1%
0228	PHILADELPHIA (PA)	9	5,372,588	2.0%	28.1%
0128	EASTERN MASSACHUSETT	9	5,313,805	2.0%	30.1%
0552	DALLAS (TX)	9	5,269,269	2.0%	32.0%
0560	HOUSTON (TX)	9	4,846,446	1.8%	33.9%
0520	ST LOUIS (MO)	9	3,482,962	1.3%	35.2%
0666	PHOENIX (AZ)	9	3,453,846	1.3%	36.4%
0920	CONNECTICUT SNET (	9	3,228,909	1.2%	37.7%
0952	GULF COAST (FL)	9	3,053,224	1.1%	38.8%
0356	SOUTHEAST (WI)	9	2,853,539	1.1%	39.9%
0628	MINNEAPOLIS (MN)	9	2,802,599	1.0%	40.9%
0566	SAN ANTONIO (TX)	9	2,727,151	1.0%	41.9%
0324	COLUMBUS (OH)	9	2,492,174	0.9%	42.9%
0524	KANSAS CITY (MO)	9	2,043,329	0.8%	43.6%
0470	NASHVILLE (TN)	9	1,998,198	0.7%	44.4%
0922	CINCINNATI BELL (O	9	1,568,153	0.6%	45.0%
0328	DAYTON (OH)	9	1,494,381	0.6%	45.5%
0558	AUSTIN (TX)	9	1,242,490	0.5%	46.0%
0248	RICHMOND (VA)	9	1,225,688	0.5%	46.5%
0460	SOUTHEAST (FL)	8	5,035,496	1.9%	48.3%
0656	DENVER (CO)	8	3,030,779	1.1%	49.5%
0732	SAN DIEGO (CA)	8	2,762,806	1.0%	50.5%
0238	BALTIMORE (MD)	8	2,442,754	0.9%	51.4%
0422	CHARLOTTE (NC)	8	2,169,072	0.8%	52.2%
0536	OKLAHOMA CITY (OK)	8	1,918,373	0.7%	52.9%
0726	SACRAMENTO (CA)	8	1,858,266	0.7%	53.6%
0490	NEW ORLEANS (LA)	8	1,655,193	0.6%	54.3%
0252	NORFOLK (VA)	8	1,565,510	0.6%	54.8%
0325	AKRON (OH)	8	1,344,439	0.5%	55.3%
0462	LOUISVILLE (KY)	8	1,326,588	0.5%	55.8%
0326	TOLEDO (OH)	8	1,300,441	0.5%	56.3%
0426	RALEIGH (NC)	8	1,261,828	0.5%	56.8%
0538	TULSA (OK)	8	1,257,312	0.5%	57.3%
0668	TUCSON (AZ)	8	955,480	0.4%	57.6%

## Appendix 2.1

### Network Provider Presence and Population by LATA

LATA Number	LATA Name	Included Networks with POPs	LATA Population	Percent of US Population	Cumulative Percent of US Population
0332	SOUTH BEND (IN)	8	917,260	0.3%	58.0%
0658	COLORADO SPRINGS (	8	828,643	0.3%	58.3%
0674	SEATTLE (WA)	7	3,893,872	1.5%	59.7%
0672	PORTLAND (OR)	7	2,785,463	1.0%	60.8%
0348	GRAND RAPIDS (MI)	7	2,325,747	0.9%	61.7%
0660	UTAH (UT)	7	2,033,083	0.8%	62.4%
0458	ORLANDO (FL)	7	1,780,526	0.7%	63.1%
0664	NEW MEXICO (NM)	7	1,718,893	0.6%	63.7%
0424	GREENSBORO (NC)	7	1,684,166	0.6%	64.4%
0136	SYRACUSE (NY)	7	1,614,956	0.6%	65.0%
0226	CAPITAL (PA)	7	1,600,543	0.6%	65.6%
0140	BUFFALO (NY)	7	1,484,730	0.6%	66.1%
0134	ALBANY (NY)	7	1,336,886	0.5%	66.6%
0430	GREENVILLE (SC)	7	1,184,081	0.4%	67.1%
0130	RHODE ISLAND (RI)	7	988,370	0.4%	67.4%
0322	YOUNGSTOWN (OH)	7	612,174	0.2%	67.7%
0540	EL PASO (TX)	7	449,380	0.2%	67.8%
0222	DELAWARE VALLEY (N	6	1,794,121	0.7%	68.5%
0468	MEMPHIS (TN)	6	1,496,081	0.6%	69.1%
0728	FRESNO (CA)	6	1,323,491	0.5%	69.6%
0452	JACKSONVILLE (FL)	6	1,312,575	0.5%	70.0%
0632	DES MOINES (IA)	6	1,139,789	0.4%	70.5%
0721	PAHRUMP (NV)	6	1,049,705	0.4%	70.9%
0974	ROCHESTER (NY)	6	984,652	0.4%	71.2%
0644	OMAHA (NE)	6	969,405	0.4%	71.6%
0534	TOPEKA (KS)	6	905,916	0.3%	71.9%
0670	EUGENE (OR)	6	890,531	0.3%	72.3%
0740	SAN LUIS OBISPO (C	6	734,935	0.3%	72.5%
0346	LANSING (MI)	6	712,076	0.3%	72.8%
0472	CHATTANOOGA (TN)	6	627,780	0.2%	73.0%
0720	RENO (NV)	6	595,892	0.2%	73.3%
0958	LINCOLN (NE)	6	565,105	0.2%	73.5%
0734	BAKERSFIELD (CA)	6	546,181	0.2%	73.7%
0482	JACKSON (MS)	5	2,336,948	0.9%	74.6%
0476	BIRMINGHAM (AL)	5	1,923,684	0.7%	75.3%
0738	STOCKTON (CA)	5	1,327,816	0.5%	75.8%
0652	IDAHO (ID)	5	1,016,213	0.4%	76.2%
0434	COLUMBIA (SC)	5	986,792	0.4%	76.5%
0464	OWENSBORO (KY)	5	886,225	0.3%	76.9%
0939	FORT MYERS (FL)	5	881,818	0.3%	77.2%
0951	ROCKY MOUNT (NC)	5	845,958	0.3%	77.5%
0126	WESTERN MASSACHUSETT	5	789,685	0.3%	77.8%
0620	ROCHESTER (MN)	5	735,509	0.3%	78.1%
0492	BATON ROUGE (LA)	5	708,688	0.3%	78.3%

## Appendix 2.1

## Network Provider Presence and Population by LATA

LATA Number	LATA Name	Included Networks with POPs	LATA Population	Percent of US Population	Cumulative Percent of US Population
0350	NORTHEAST (WI)	5	673,514	0.3%	78.6%
0133	POUGHKEEPSIE (NY)	5	671,646	0.3%	78.8%
0480	MOBILE (AL)	5	655,670	0.2%	79.1%
0334	AUBURN/HUNTINGTON	5	626,798	0.2%	79.3%
0352	NORTHWEST (WI)	5	614,102	0.2%	79.5%
0724	CHICO (CA)	5	596,506	0.2%	79.8%
0564	CORPUS CHRISTI (TX)	5	577,700	0.2%	80.0%
0448	PENSACOLA (FL)	5	508,055	0.2%	80.2%
0246	CULPEPER (VA)	5	479,965	0.2%	80.4%
0562	BEAUMONT (TX)	5	412,336	0.2%	80.5%
0953	TALLAHASSEE (FL)	5	365,811	0.1%	80.6%
0736	MONTEREY (CA)	5	354,474	0.1%	80.8%
0456	DAYTONA BEACH (FL)	5	322,073	0.1%	80.9%
0528	LITTLE ROCK (AR)	4	1,755,571	0.7%	81.6%
0232	NORTHEAST (PA)	4	1,597,484	0.6%	82.2%
0466	WINCHESTER (KY)	4	1,502,697	0.6%	82.7%
0676	SPOKANE (WA)	4	1,260,020	0.5%	83.2%
0120	MAINE (ME)	4	1,244,747	0.5%	83.7%
0532	WICHITA (KS)	4	1,203,894	0.5%	84.1%
0474	KNOXVILLE (TN)	4	1,054,078	0.4%	84.5%
0354	SOUTHWEST (WI)	4	1,036,100	0.4%	84.9%
0230	ALTOONA (PA)	4	1,015,684	0.4%	85.3%
0344	SAGINAW (MI)	4	986,913	0.4%	85.6%
0454	GAINESVILLE (FL)	4	985,933	0.4%	86.0%
0254	CHARLESTON (WV)	4	940,063	0.4%	86.4%
0244	ROANOKE (VA)	4	922,644	0.3%	86.7%
0488	LAFAYETTE (LA)	4	866,178	0.3%	87.0%
0522	SPRINGFIELD (MO)	4	845,697	0.3%	87.3%
0440	SAVANNAH (GA)	4	839,849	0.3%	87.7%
0636	FARGO (ND)	4	793,119	0.3%	88.0%
0923	MANSFIELD (OH)	4	732,677	0.3%	88.2%
0635	CEDAR RAPIDS (IA)	4	722,819	0.3%	88.5%
0444	ALBANY (GA)	4	664,520	0.2%	88.7%
0256	CLARKSBURG (WV)	4	662,386	0.2%	89.0%
0432	FLORENCE (SC)	4	608,879	0.2%	89.2%
0556	WACO (TX)	4	599,161	0.2%	89.4%
0446	MACON (GA)	4	570,151	0.2%	89.7%
0436	CHARLESTON (SC)	4	557,528	0.2%	89.9%
0442	AUGUSTA (GA)	4	533,647	0.2%	90.1%
0240	HAGERSTOWN (MD)	4	486,043	0.2%	90.3%
0542	MIDLAND (TX)	4	472,144	0.2%	90.4%
0544	LUBBOCK (TX)	4	410,487	0.2%	90.6%
0330	EVANSVILLE (IN)	4	399,759	0.1%	90.7%
0220	ATLANTIC COASTAL (	4	397,918	0.1%	90.9%

## Appendix 2.1

### Network Provider Presence and Population by LATA

LATA Number	LATA Name	Included Networks with POPs	LATA Population	Percent of US Population	Cumulative Percent of US Population
0961	SAN ANGELO (TX)	4	360,614	0.1%	91.0%
0250	LYNCHBURG (VA)	4	346,828	0.1%	91.1%
0924	ERIE (PA)	4	323,899	0.1%	91.3%
0342	UPPER PENINSULA (MI)	4	323,101	0.1%	91.4%
0450	PANAMA CITY (FL)	4	322,029	0.1%	91.5%
0550	ABILENE (TX)	4	249,084	0.1%	91.6%
0570	HEARNE (TX)	4	209,441	0.1%	91.7%
0937	RICHMOND (IN)	4	176,992	0.1%	91.7%
0834	HAWAII (HI)	3	1,190,432	0.4%	92.2%
0122	NEW HAMPSHIRE (NH)	3	1,171,443	0.4%	92.6%
0478	MONTGOMERY (AL)	3	930,208	0.3%	93.0%
0640	SOUTH DAKOTA (SD)	3	736,018	0.3%	93.3%
0949	FAYETTEVILLE (NC)	3	722,517	0.3%	93.5%
0138	BINGHAMTON (NY)	3	680,819	0.3%	93.8%
0554	LONGVIEW (TX)	3	676,778	0.3%	94.0%

## Appendix 2.1

## Network Provider Presence and Population by LATA

LATA Number	LATA Name	Included Networks with POPs	LATA Population	Percent of US Population	Cumulative Percent of US Population
0477	HUNTSVILLE (AL)	3	659,779	0.2%	94.3%
0634	DAVENPORT (IA)	3	634,344	0.2%	94.5%
0338	BLOOMINGTON (IN)	3	592,096	0.2%	94.7%
0124	VERMONT (VT)	3	591,659	0.2%	95.0%
0956	BRISTOL (TN)	3	561,572	0.2%	95.2%
0654	WYOMING (WY)	3	482,183	0.2%	95.4%
0368	PEORIA (IL)	3	478,651	0.2%	95.5%
0648	GREAT FALLS (MT)	3	463,739	0.2%	95.7%
0420	ASHEVILLE (NC)	3	451,295	0.2%	95.9%
0526	FORT SMITH (AR)	3	449,342	0.2%	96.0%
0546	AMARILLO (TX)	3	446,995	0.2%	96.2%
0626	ST CLOUD (MN)	3	434,668	0.2%	96.4%
0650	BILLINGS (MT)	3	422,945	0.2%	96.5%
0428	WILMINGTON (NC)	3	410,710	0.2%	96.7%
0646	GRAND ISLAND (NE)	3	390,159	0.1%	96.8%
0973	PALM SPRINGS (CA)	3	387,978	0.1%	97.0%
0630	SIOUX CITY (IA)	3	356,382	0.1%	97.1%
0374	SPRINGFIELD (IL)	3	351,465	0.1%	97.2%
0484	BILOXI (MS)	3	347,582	0.1%	97.4%
0360	ROCKFORD (IL)	3	344,812	0.1%	97.5%
0638	BISMARCK (ND)	3	339,085	0.1%	97.6%
0530	PINE BLUFF (AR)	3	323,537	0.1%	97.7%
0366	FORREST (IL)	3	306,857	0.1%	97.9%
0568	BROWNSVILLE (TX)	3	292,584	0.1%	98.0%
0370	CHAMPAIGN (IL)	3	289,587	0.1%	98.1%
0362	CAIRO (IL)	3	280,391	0.1%	98.2%
0548	WICHITA FALLS (TX)	3	254,615	0.1%	98.3%
0624	DULUTH (MN)	3	247,328	0.1%	98.4%
0960	COEUR D'ALENE (ID)	3	232,177	0.1%	98.5%
0521	WESTPHALIA (MO)	3	227,476	0.1%	98.5%
0938	TERRE HAUTE (IN)	3	221,921	0.1%	98.6%
0364	STERLING (IL)	3	213,930	0.1%	98.7%
0978	OLNEY (IL)	3	213,214	0.1%	98.8%
0928	CHARLOTTESVILLE (V)	3	190,584	0.1%	98.9%
0932	BLUEFIELD (WV)	3	187,550	0.1%	98.9%
0977	GALESBURG (IL)	3	182,825	0.1%	99.0%
0376	QUINCY (IL)	3	173,257	0.1%	99.1%
0927	HARRISONBURG (VA)	3	83,541	0.0%	99.1%
0929	EDINBURG (VA)	3	55,694	0.0%	99.1%
0486	SHREVEPORT (LA)	2	1,117,403	0.4%	99.5%
0242	SALISBURY (MD)	2	340,853	0.1%	99.7%
0976	MATTOON (IL)	2	193,058	0.1%	99.7%
0832	ALASKA (AK)	1	611,136	0.2%	100.0%
0980	NAVAJO RESV. (AZ)	1	96,905	0.0%	100.0%

## Appendix 2.1

### Network Provider Presence and Population by LATA

LATA Number	LATA Name	Included Networks with POPs	LATA Population	Percent of US Population	Cumulative Percent of US Population
0981	NAVAJO RESV. (UT)	1	9,149	0.0%	100.0%
0921	FISHERS ISLAND (NY)	1	3,976	0.0%	100.0%

Source: CCMI Qtel 9000 Master Rate Center File; Qwest; IXC; Williams; LCI; Frontier.

Note: Includes POPs scheduled to be deployed by 1999.

## Appendix 2.2

## Network Provider Points of Presence by LATA

Network Provider with POP in LATA												
LATA Number	LATA Name	Total Included Networks with POPs	AT&T	MCI	Sprint	WorldCom	Cable & Wireless	Qwest	IXC	Williams	Frontier	LCI
0438	ATLANTA (GA)	10	X	X	X	X	X	X	X	X	X	X
0368	CHICAGO (IL)	10	X	X	X	X	X	X	X	X	X	X
0320	CLEVELAND (OH)	10	X	X	X	X	X	X	X	X	X	X
0940	DETROIT (MI)	10	X	X	X	X	X	X	X	X	X	X
0336	INDIANAPOLIS (IN)	10	X	X	X	X	X	X	X	X	X	X
0730	LOS ANGELES (CA)	10	X	X	X	X	X	X	X	X	X	X
0132	NEW YORK METRO (NY)	10	X	X	X	X	X	X	X	X	X	X
0224	NORTH JERSEY (NJ)	10	X	X	X	X	X	X	X	X	X	X
0234	PITTSBURGH (PA)	10	X	X	X	X	X	X	X	X	X	X
0236	WASHINGTON (DC)	10	X	X	X	X	X	X	X	X	X	X
0558	AUSTIN (TX)	9	X	X	X	X	X	X	X	X	X	
0922	CINCINNATI BELL (O	9	X	X	X	X	X	X	X	X	X	X
0324	COLUMBUS (OH)	9	X	X	X	X		X	X	X	X	X
0920	CONNECTICUT SNET (	9	X	X	X	X	X	X	X	X	X	
0552	DALLAS (TX)	9	X	X	X	X	X	X	X	X	X	
0328	DAYTON (OH)	9	X	X	X	X		X	X	X	X	
0128	EASTERN MASSACHUSET	9	X	X	X	X	X	X	X	X	X	
0952	GULF COAST (FL)	9	X	X	X	X	X	X	X	X	X	
0560	HOUSTON (TX)	9	X	X	X	X	X	X	X	X	X	
0524	KANSAS CITY (MO)	9	X	X	X	X	X	X	X	X	X	
0628	MINNEAPOLIS (MN)	9	X	X	X	X	X	X	X	X	X	
0470	NASHVILLE (TN)	9	X	X	X	X	X	X	X	X	X	
0228	PHILADELPHIA (PA)	9	X	X	X	X	X	X	X	X	X	
0666	PHOENIX (AZ)	9	X	X	X	X	X	X	X	X	X	
0248	RICHMOND (VA)	9	X	X	X	X	X	X	X	X	X	
0566	SAN ANTONIO (TX)	9	X	X	X	X	X	X	X	X	X	
0722	SAN FRANCISCO (CA)	9	X	X	X	X	X	X	X	X	X	
0356	SOUTHEAST (WI)	9	X	X	X	X	X	X	X	X	X	
0520	ST LOUIS (MO)	9	X	X	X	X	X	X	X	X	X	
0325	AKRON (OH)	8	X	X	X	X		X		X	X	X
0238	BALTIMORE (MD)	8	X	X	X	X		X	X	X	X	
0422	CHARLOTTE (NC)	8	X	X	X	X		X		X	X	X
0658	COLORADO SPRINGS (	8	X	X	X	X		X		X	X	
0656	DENVER (CO)	8	X	X	X	X		X	X	X	X	
0462	LOUISVILLE (KY)	8	X	X	X	X		X	X		X	X
0490	NEW ORLEANS (LA)	8	X	X	X	X	X	X		X		
0252	NORFOLK (VA)	8	X	X	X	X	X	X		X	X	
0536	OKLAHOMA CITY (OK)	8	X	X	X	X		X	X		X	
0426	RALEIGH (NC)	8	X	X	X	X	X	X		X	X	
0726	SACRAMENTO (CA)	8	X	X	X	X		X	X	X	X	
0732	SAN DIEGO (CA)	8	X	X	X	X		X	X	X	X	
0332	SOUTH BEND (IN)	8	X	X	X	X		X	X		X	X
0460	SOUTHEAST (FL)	8	X	X	X	X	X	X		X		
0326	TOLEDO (OH)	8	X	X	X	X		X	X		X	X
0668	TUCSON (AZ)	8	X	X	X	X		X	X	X	X	
0538	TULSA (OK)	8	X	X	X	X		X	X	X	X	
0134	ALBANY (NY)	7	X	X	X	X		X		X	X	
0140	BUFFALO (NY)	7	X	X	X	X		X		X	X	
0226	CAPITAL (PA)	7	X	X	X	X		X		X	X	X
0540	EL PASO (TX)	7	X	X	X	X		X	X		X	
0348	GRAND RAPIDS (MI)	7	X	X	X	X		X	X	X	X	
0424	GREENSBORO (NC)	7	X	X	X	X		X		X	X	
0430	GREENVILLE (SC)	7	X	X	X	X		X		X	X	
0664	NEW MEXICO (NM)	7	X	X	X	X		X	X		X	
0458	ORLANDO (FL)	7	X	X	X	X	X	X		X		
0672	PORTLAND (OR)	7	X	X	X	X		X		X	X	
0130	RHODE ISLAND (RI)	7	X	X	X	X		X		X	X	
0674	SEATTLE (WA)	7	X	X	X	X		X		X	X	
0136	SYRACUSE (NY)	7	X	X	X	X		X		X	X	
0660	UTAH (UT)	7	X	X	X	X		X		X	X	
0322	YOUNGSTOWN (OH)	7	X	X	X	X		X			X	X
0734	BAKERSFIELD (CA)	6	X	X	X	X		X	X			
0472	CHATTANOOGA (TN)	6	X	X	X	X		X			X	
0222	DELAWARE VALLEY (N	6	X	X	X	X		X			X	
0632	DES MOINES (IA)	6	X	X	X	X		X	X		X	
0670	EUGENE (OR)	6	X	X	X	X		X			X	
0728	FRESNO (CA)	6	X	X	X	X		X	X			
0452	JACKSONVILLE (FL)	6	X	X	X	X		X		X		
0346	LANSING (MI)	6	X	X	X	X			X		X	
0958	LINCOLN (NE)	6	X	X	X	X		X			X	
0468	MEMPHIS (TN)	6	X	X	X	X				X		X
0644	OMAHA (NE)	6	X	X	X	X		X			X	

## Appendix 2.2

## Network Provider Points of Presence by LATA

LATA Number	LATA Name	Total Included Networks with POPs	Network Provider with POP in LATA									
			AT&T	MCI	Sprint	WorldCom	Cable & Wireless	Qwest	IXC	Williams	Frontier	LCI
0721	PAHRUMP (NV)	6	X	X	X	X			X	X		
0720	RENO (NV)	6	X	X	X	X		X			X	
0974	ROCHESTER (NY)	6	X	X	X			X		X	X	
0740	SAN LUIS OBISPO (C)	6	X	X	X	X		X			X	
0534	TOPEKA (KS)	6	X	X	X	X		X			X	
0334	AUBURN/HUNTINGTON	5	X	X	X	X						X
0492	BATON ROUGE (LA)	5	X	X	X	X				X		
0562	BEAUMONT (TX)	5	X	X	X	X		X				
0476	BIRMINGHAM (AL)	5	X	X	X	X				X		
0724	CHICO (CA)	5	X	X	X			X			X	
0434	COLUMBIA (SC)	5	X	X	X	X		X				
0564	CORPUS CHRISTI (TX)	5	X	X	X	X			X			
0246	CULPEPER (VA)	5	X	X	X			X			X	
0456	DAYTONA BEACH (FL)	5	X	X	X			X		X		
0939	FORT MYERS (FL)	5	X	X	X	X		X				
0652	IDAHO (ID)	5	X	X	X				X	X		
0482	JACKSON (MS)	5	X	X	X	X				X		
0480	MOBILE (AL)	5	X	X	X	X		X				
0736	MONTEREY (CA)	5	X	X	X			X			X	
0350	NORTHEAST (WI)	5	X	X	X			X			X	
0352	NORTHWEST (WI)	5	X	X	X			X			X	
0464	OWENSBORO (KY)	5	X	X	X			X			X	
0448	PENSACOLA (FL)	5	X	X	X	X		X				
0133	POUGHKEEPSIE (NY)	5	X	X	X			X			X	
0620	ROCHESTER (MN)	5	X	X	X			X			X	
0951	ROCKY MOUNT (NC)	5	X	X	X			X			X	
0738	STOCKTON (CA)	5	X	X	X	X		X				
0953	TALLAHASSEE (FL)	5	X	X	X	X		X				
0126	WESTERN MASSACHUSET	5	X	X	X			X			X	
0550	ABILENE (TX)	4	X	X	X				X			
0444	ALBANY (GA)	4	X	X	X			X				
0230	ALTOONA (PA)	4	X	X	X						X	
0220	ATLANTIC COASTAL (	4	X	X	X	X						
0442	AUGUSTA (GA)	4	X	X	X	X		X				
0635	CEDAR RAPIDS (IA)	4	X	X	X						X	
0436	CHARLESTON (SC)	4	X	X	X	X						
0254	CHARLESTON (WV)	4	X	X	X	X						
0256	CLARKSBURG (WV)	4	X	X	X	X						
0924	ERIE (PA)	4	X	X	X						X	
0330	EVANSVILLE (IN)	4	X	X	X							X
0636	FARGO (ND)	4	X	X	X	X						
0432	FLORENCE (SC)	4	X	X	X	X						
0454	GAINESVILLE (FL)	4	X	X	X	X						
0240	HAGERSTOWN (MD)	4	X	X	X	X						
0570	HEARNE (TX)	4	X	X	X			X				
0474	KNOXVILLE (TN)	4	X	X	X	X						
0488	LAFAYETTE (LA)	4	X	X	X			X				
0528	LITTLE ROCK (AR)	4	X	X	X	X						
0544	LUBBOCK (TX)	4	X	X	X				X			
0250	LYNCHBURG (VA)	4	X	X	X	X						
0446	MACON (GA)	4	X	X	X			X				
0120	MAINE (ME)	4	X	X	X	X						
0923	MANSFIELD (OH)	4	X	X	X							X
0542	MIDLAND (TX)	4	X	X	X				X			
0232	NORTHEAST (PA)	4	X	X	X	X						
0450	PANAMA CITY (FL)	4	X	X	X	X						
0937	RICHMOND (IN)	4	X	X	X							X
0244	ROANOKE (VA)	4	X	X	X	X						
0344	SAGINAW (MI)	4	X	X	X				X			
0961	SAN ANGELO (TX)	4	X	X	X				X			
0440	SAVANNAH (GA)	4	X	X	X			X				
0354	SOUTHWEST (WI)	4	X	X	X	X						
0676	SPOKANE (WA)	4	X	X	X	X						
0522	SPRINGFIELD (MO)	4	X	X	X				X			
0342	UPPER PENINSULA (M	4	X	X	X						X	
0556	WACO (TX)	4	X	X	X				X			
0532	WICHITA (KS)	4	X	X	X	X						
0466	WINCHESTER (KY)	4	X	X	X	X						
0546	AMARILLO (TX)	3	X	X	X							
0420	ASHEVILLE (NC)	3	X	X	X							
0650	BILLINGS (MT)	3	X	X	X							
0484	BILOXI (MS)	3	X	X	X							

## Appendix 2.2

## Network Provider Points of Presence by LATA

LATA Number	LATA Name	Total Included Networks with POPs	Network Provider with POP in LATA									
			AT&T	MCI	Sprint	WorldCom	Cable & Wireless	Qwest	IXC	Williams	Frontier	LCI
0138	BINGHAMTON (NY)	3	X	X	X							
0638	BISMARCK (ND)	3	X	X	X							
0338	BLOOMINGTON (IN)	3	X	X	X							
0932	BLUEFIELD (WV)	3	X	X	X							
0956	BRISTOL (TN)	3	X	X	X							
0568	BROWNSVILLE (TX)	3	X	X	X							
0362	CAIRO (IL)	3	X	X	X							
0370	CHAMPAIGN (IL)	3	X	X	X							
0928	CHARLOTTESVILLE (V)	3	X	X	X							
0960	COEUR D'ALENE (ID)	3	X	X	X							
0634	DAVENPORT (IA)	3	X	X	X							
0624	DULUTH (MN)	3	X	X	X							
0929	EDINBURG (VA)	3	X	X	X							
0949	FAYETTEVILLE (NC)	3	X	X	X							
0366	FORREST (IL)	3	X	X	X							
0526	FORT SMITH (AR)	3	X	X	X							
0977	GALESBURG (IL)	3	X	X	X							
0646	GRAND ISLAND (NE)	3	X	X	X							
0648	GREAT FALLS (MT)	3	X	X	X							
0927	HARRISONBURG (VA)	3	X	X	X							
0834	HAWAII (HI)	3	X	X	X							
0477	HUNTSVILLE (AL)	3	X	X	X							
0554	LONGVIEW (TX)	3	X	X	X							
0478	MONTGOMERY (AL)	3	X	X	X							
0122	NEW HAMPSHIRE (NH)	3	X	X	X							
0978	OLNEY (IL)	3	X	X	X							
0973	PALM SPRINGS (CA)	3	X	X	X							
0368	PEORIA (IL)	3	X	X	X							
0530	PINE BLUFF (AR)	3	X	X	X							
0376	QUINCY (IL)	3	X	X	X							
0360	ROCKFORD (IL)	3	X	X	X							
0630	SIOUX CITY (IA)	3	X	X	X							
0640	SOUTH DAKOTA (SD)	3	X	X	X							
0374	SPRINGFIELD (IL)	3	X	X	X							
0626	ST CLOUD (MN)	3	X	X	X							
0364	STERLING (IL)	3	X	X	X							
0938	TERRE HAUTE (IN)	3	X	X	X							
0124	VERMONT (VT)	3	X	X	X							
0521	WESTPHALIA (MO)	3	X	X	X							
0548	WICHITA FALLS (TX)	3	X	X	X							
0428	WILMINGTON (NC)	3	X	X	X							
0654	WYOMING (WY)	3	X	X	X							
0976	MATTOON (IL)	2	X	X								
0242	SALISBURY (MD)	2	X	X								
0486	SHREVEPORT (LA)	2	X	X								
0832	ALASKA (AK)	1	X									
0921	FISHERS ISLAND (NY)	1	X									
0980	NAVAJO RESV. (AZ)	1	X									
0981	NAVAJO RESV (UT)	1	X									
0820	PUERTO RICO (PR)	1	X									
0822	US VIRGIN ISLANDS	1	X									

Source: CCM1 Qtel 9000 Master Rate Center File; Qwest; IXC; Williams; LCI; Frontier.

Note: Includes POPs scheduled to be deployed by 1999.